munication with the Global Position System (GPS) or other navigation systems. Haptic effects can also be used to convey navigation information, such as positional and/or directional information, to handheld users. By way of example, **FIG. 8** shows a flowchart **800** depicting a method of haptic navigation, according to an embodiment of the present invention. The flowchart **800** discloses receiving an input signal associated with a position of a handheld communication device at step **810**; determining the position of a handheld communication device relative to a predetermined location at step **820**; and providing a haptic effect associated with the determination at step **830**. Step **830** may include outputting a control signal associated with the determination to an actuator coupled to the handheld communication device, the control signal being configured to cause the actuator to output the haptic effect. Further, the input signal at step **810** may be received from GPS, a digital compass, or other navigation systems known in the art.

[**0051**] In one embodiment, the haptic effect may be associated with a distance between the position of the handheld communication device and a predetermined location (termed "destination" herein). For example, the haptic effect may include a vibration having a magnitude and a frequency, where at least one of the magnitude and the frequency decreases as the distance from the destination diminishes. Additionally, the haptic effect may be configured to convey a quantitative measure of the distance. By way of example, the haptic effect may include one or more pulse or jolt sensations, where the number of pulses is proportional to the number of miles between the position of the handheld device and the destination.

[**0052**] Processors described above (including processor **120** of **FIG. 1**) can include, for example, one or more digital logical processors capable of processing input, execute algorithms, and generate output as necessary to perform various tasks, such as those described above. Such processors/controllers may include a microprocessor, an Application Specific Integrated Circuit (ASIC), and state machines. Such processors include, or may be in communication with, media (including memory **140** of **FIG. 1**). Such media include, for example, computer readable media, which stores program code that, when executed by a processor, cause the processor to perform the steps described herein. Embodiments of computer-readable media include, but are not limited to, an electronic, optical, magnetic, or other storage or transmission device capable of providing a processor, such as the processor in a web server, with computer-readable instructions. Other examples of suitable media include, but are not limited to, a floppy disk, CD-ROM, magnetic disk, memory chip, ROM, RAM, ASIC, configured processor, all optical media, all magnetic tape or other magnetic media, or any other medium from which a computer processor can read. Also, various other forms of computer-readable media may transmit or carry instructions to a computer, including a router, private or public network, or other transmission device or channel.

[**0053**] Program code and associated application programs related to various applications may also reside on a remote source, such as a network resource, a Web server, a remote handheld communication device or computer, which can be transmitted or downloaded to a handheld communication device on a regular or predetermined basis. Haptic effects (along with associated control signals) can also be downloaded or transmitted from a remote source, as described above.

[**0054**] Actuators described above (including actuator **130** shown in **FIG. 1**) can include, for example, a pager motor, an eccentric rotating motor, a harmonic eccentric rotating motor, a voice coil, a solenoid, a resistive actuator, a piezoelectric actuator, an electro-active polymer actuator, or other types of active/passive actuators suitable for generating haptic effects. U.S. Pat. Nos. 6,429,846 and 6,424,333 disclose further details relating to some of these actuators, both of which are incorporated in full herein by reference. In some embodiments, one or more actuators may be implemented in a handheld communication device, configured to deliver appropriate haptic effects. It will be appreciated that various control schemes can be devised accordingly, for controlling the actuator(s) in a manner that best achieves the desired haptic effects.

[**0055**] Referring back to **FIG. 1**. In one embodiment, actuator **130** may be coupled to housing **110**, thereby imparting haptic effects thus generated to the device body. Haptic ringers (or alerts) described above may be delivered in this manner, for instance. In another embodiment, actuator **130** may be coupled to user-interface **112** of the device body. For instance, an active and/or resistive actuator can be coupled to user-interface **112** to deliver a virtual touch described above. One or more actuators can also be coupled to user-interface **112**, for example, to convey a virtual touch such to a user. In yet another embodiment, a plurality of actuators can be coupled to housing **110** as well as user-interface **112**. In addition, one or more actuators may also be coupled to a headset, a wristband, or other accessory means associated with a handheld communication device.

[**0056**] Embodiments of the invention include the following.

[**0057**] In one embodiment, an individual (or "Bob") can have a mobile phone according to the invention. The mobile phone also has an e-mail capability, for example, including both "receive" and "send"). The mobile phone is configured to provide a plurality of haptic effects, e.g., by including appropriate hardware (such as actuators described above) and program code. Bob can program the mobile phone, for example, via user-interface **112** through API **150** shown in **FIG. 1**, by inputting various events of interest and associating each with a distinct haptic effect. Thus, when an event of interest is subsequently received, the mobile phone provides the corresponding haptic effect.

[**0058**] In one embodiment, Bob's phone includes programming that provides a first haptic effect when an input signal is received from the mobile phone of Bob's wife (or "Alice"). Bob's phone also includes programming that provides a second haptic effect that is different and distinct from the first haptic effect, when an input signal is received from the mobile phone of Bob's supervisor at work (termed "Carol" herein). Bob's phone is further be configured to provide a third haptic effect that is different from the two mentioned above, e.g., when an e-mail is received from the e-mail address of Bob's stock broker (where the e-mail contains a "smiley-face" emoticon, for instance). The third haptic effect can be a vibration with high magnitude and short duration, e.g., to emulate a "high-five."

[**0059**] In another embodiment, Bob can be watching a movie in a theater with his mobile phone in his pocket. It is